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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,864	09/24/2003	Dana A. Gronbeck	51757	5134
21874	7590	09/30/2005	EXAMINER	
EDWARDS & ANGELL, LLP			WILLIAMS, ALEXANDER O	
P.O. BOX 55874			ART UNIT	PAPER NUMBER
BOSTON, MA 02205			2826	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/669,864	GRONBECK ET AL. <i>(initials)</i>	
	<b>Examiner</b>	<b>Art Unit</b>	
	Alexander O. Williams	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 07 July 2005.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.
  - 4a) Of the above claim(s) 10-26 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-9 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

Serial Number: 10/669864 Attorney's Docket #: 51757  
Filing Date: 9/24/03;

Applicant: Gronbeck et al.

Examiner: Alexander Williams

This application claims the benefit of provisional application number 60/413265, filed 9/24/02.

Applicant's Amendment filed 7/7/05 to the election of species of figure 2A in which related to the complete species of figures 2A-2J (claims 1 to 9), filed 12/2/04, has been acknowledged.

This application contains claims 10 to 26 drawn to an invention non-elected with traverse. A complete response to the final rejection must include cancellation of non-elected claims or other appropriate action (see 37 CFR § 1.144 & MPEP § 821.01).

Claims 1 to 9 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. It appears the removable material being a particular material is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The dielectric layer includes a removable material, being porogen or pre-porous is not claimed. Therefore, the removable material can be any material since all materials are removable. In claims 1-9, it is unclear what is meant by the claimed structure being described as being removable. What is the final structure claimed.

Any of claims 1 to 9 not specifically addressed above are rejected as being dependent on one or more of the claims which have been specifically objected to above.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Initially, and with respect to claims 1 to 9, note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases as the above case law makes clear.

Claims 1 to 9, **insofar as they can be understood**, are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kessler et al. (U.S. Patent # 5,110,712).

Claim 1. Kessler et al. (figures 1 to 5) specifically figure 4 show an electronic device comprising a first dielectric layer 14 comprising a first removable material,(this can be any material) and a second dielectric layer 30 comprising a second removable material (this can be any material).

Claim 2. The electronic device of claim 1, Kessler et al. further comprising an etch differentiating layer disposed between the first dielectric layer and the second dielectric layer.

Claim 3. The electronic device of claim 2, Kessler et al. show wherein the etch differentiating layer comprises a third removable material.

Claim 4. The electronic device of claim 1 wherein at least one of the first removable material and second removable material comprises cross-linked polymeric particles.

Claim 5. The electronic device of claim 1, Kessler et al. show wherein the first dielectric layer and the second dielectric layer have an etch differential of at least 1:2.

Claim 6. The electronic device of claim 1, Kessler et al. show wherein both the first dielectric layer and the second dielectric layer are inorganic.

Claim 7. The electronic device of claim 1, Kessler et al. further comprising a third layer on the second layer, wherein the third layer is inorganic.

Claim 8. The electronic device of claim 7, Kessler et al. show wherein the third layer comprises a fourth removable material.

Claim 9. The electronic device of claim 9, Kessler et al. show wherein the third layer has sufficient porosity to allow for removal of the first removable material and the second removable material through the third layer.

As to the grounds of rejection under section 103, see MPEP § 2113.

US 5110712 A May 5, 1992  
INT-CL (IPC) : G03C005/00, H01L021/31

**BASIC-ABSTRACT:**

A composite dielectric layer is formed in an integrated circuit to facilitate high density multi- level interconnects with external contacts through the use of high strength dielectric layers to support high stress metal layers. This composite dielectric layer is fabricated by:- (1) forming a polymer layer

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(20) on a first inorganic layer (14) to provide a planarised surface (22), (2) Depositing a second inorganic layer (24) on the planarised surface (22) to form an inorganic mast (30) for etching polymer layer (20), and (3) Etching polymer layer (20) using first inorganic layer (14) as an etch stop to allow long over etches to achieve full exposure of external contact surfaces of conductors to be connected to subsequently deposited metal layers (40, 42).

A polyimide polymer layer (20) is deposited onto the underlying layers (14, 12), which include metal features (16, 18), by suspending in a solvent and uniformly distributing by spinning the integrated circuit device being formed. The 4000 Angstrom thick polymer layer (20) is pref. thermally cured to remove the solvent, after which it is baked at low temp. to drive out any moisture. Deposition of the second inorganic layer (24) pref. comprises applying SiO<sub>2</sub> using either plasma enhanced CVD or atmos. pressure deposition or Si<sub>3</sub>N<sub>4</sub> using plasma enhanced CVD. A masking layer (28) is then formed on the SiO<sub>2</sub>/Si<sub>3</sub>N<sub>4</sub> layer (24) pref. by depositing a photoresist layer that is highly planarised so that small features can be transferred to the polymer layer exposing the photoresist layer photolithographically with a predetermined masking pattern, and etching.

ABSTRACTED-PUB-NO: US 5110712A

Composite dielectric sandwich is formed in an integrated circuit (I) by the use of inorganic dielectric layers. Firstly, a first inorganic dielectric layer (II) is formed, over at least one underlying layer of (I), that has sufficient strength to protect the underlying layer, by distributing stress from subsequently formed metal features that are deposited on layer (II).

First metal features are then formed on layer (II). A polymer layer (II) is formed over layer (II), and the first metal features to (I), layer (III) being uniformly distributed to provide a planarised surface. A second inorganic dielectric layer (IV) is then deposited in (I), over layer (III), that provides sufficient strength to protect layer (III) by distributing stress from subsequently formed second metal features that are deposited on layer (IV).

A mask is formed on layer (IV). Layer (IV) is etched, using the mask as a masking pattern, to form an inorganic dielectric mask (V), and to provide a protective layer for etching of any

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subsequently deposited polymer layers. Layer (III) is etched, using the mask (V) as a masking pattern, to remove all polymer unmasked by mask (V), between mask (V) and layer (II), such that layer (II) functions as a protective and etch stop for the underlying layers, wherever the etching of layer (III) continues after all the unmasked polymer has been removed to fully expose any existing external contact surfaces of the first metal features. Layer (IV) is maintained as an insulating layer that, together with layer (III), forms the composite dielectric sandwich that has sufficient strength to distribute stress from subsequently formed second metal features and that remains in (I) as an etch stop layer for subsequently formed layers in a multilayer integrated circuit. Finally, second metal features are formed on layer (IV) on in vias formed by etching layer (III).

ADVANTAGE - etch selectivity concerns between the polymer and the photolithographic mask are eliminated, allowing small features to be easily transferred into the polymer using standard dry etch techniques.

## Response

Applicant's arguments filed 7/7/05 have been fully considered, but are moot in view of the outstanding grounds of rejections detailed above.

In response to applicant's argument that removable material is not in and of itself the dielectric layer, rather the dielectric layer includes a removable material, such as a porogen, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically

pointing out how the language of the claims patentably distinguishes them from the references.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the dielectric layer includes a removable material, being porogen or pre-porous) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Accordingly, **THIS ACTION IS MADE FINAL**. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE

MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

Field of Search	Date
U.S. Class and subclass: 257/700,701,758,760,759	3/2/05
Other Documentation: foreign patents and literature in 257/700,701,758,760,759	3/2/05
Electronic data base(s): U.S. Patents EAST	3/2/05

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O. Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexander O Williams  
Primary Examiner  
Art Unit 2826

AOW  
9/22/05